

# Hazard Control Plan Cover Sheet

**Work/Activity:** Boat/Raft and Water Safety

**Identification Number:** LANL-RRES-ECO-SF-HCP/OP-010, R4

**Author:**

<u>Phil Fresquez</u>		
Name	Signature	Date

**Initial Risk Level:** Medium/Low

**Consultation**

☐ Not Required      ☐ Required

**Concurrence**

☐ Not Required      ☐ Required

<u></u>	<u></u>	<u></u>
Name (ECO Subject-Matter Expert)	Signature (as required)	Date

<u></u>	<u></u>	<u></u>
Name (Independent Peer)	Signature (as required)	Date

<u></u>	<u></u>	<u></u>
Safety Officer	Signature	Date

<u></u>	<u></u>	<u></u>
Team Leader	Signature	Date

**Residual Risk Level:** Low/Minimal

**Authorization of Work:**

<u></u>	<u></u>	<u></u>
Group or Deputy Group Leader	Signature	Date

**Next Review Date:**

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## 1.0 INTRODUCTION

**1.1 Background** As part of the routine Environmental Surveillance Program at Los Alamos National Laboratory, the sampling of fish helps to determine background levels of potential environmental contaminants and to detect any above-background concentrations caused by Laboratory activities.

All samples associated with the Soil, Foodstuffs, and Biota Monitoring Program are environmental samples; as such, radionuclide concentrations are at or near background concentrations and are not health and safety concerns.

Fish are sampled in two reservoirs—Abiquiu and Cochiti—and periodically in the Rio Grande. Heron and El Vado are also sampled at times. Water and sediment samples are also occasionally collected along the Rio Grande and at Cochiti Reservoir.

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### 1.2 In this Document

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### 1.0 INTRODUCTION (cont.)

**1.3 History of Revision** This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0		Revision number not used.
1		New document.
2	8/89	Update of procedure.
3	10/91	Update of procedure.
4	5/93	Update of procedure.
5		Revised into new format, process updated.
0	2/97	New group name
1	4/99	Reformatted in accordance with LIR300-00-01, Safe Work Practices
2	4/01	Added new Section 9.0, Training, and information about electrofishing and the catacraft.
3	4/02	New directorate
4	4/03	Team name change to Environmental Surveillance.

### 2.0 PURPOSE

This Environmental Surveillance Team procedure describes the boating and water safety steps that must be followed when conducting the fish, water, and sediment sampling activities in selected reservoirs and the Rio Grande.

### 3.0 SCOPE

This procedure applies to all group personnel who use or travel in the boat or raft in rivers or lakes.

### 4.0 DEFINITIONS

**4.1 Terms** Electrofishing: The taking of fish by a system based on their tendency to respond positively to a source of direct electric current.

### 5.0 RESPONSIBILITIES

**5.1 Principal Investigator** Principal investigators (PIs) are responsible for

- Defining the components of and the processes associated with the work in sufficient detail to enable hazards to be identified and adequately controlled;
- Determining required training for workers;
- Ensuring that assigned workers are trained and meet authorization to work standards; and
- Ensuring that workers have the knowledge, skills, and abilities needed to perform the work safely.

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- 5.2 Workers**      Workers, with assistance as needed, are responsible for
- Identifying and evaluating the hazards associated with the work, as necessary, to ensure that the controls are adequate to perform the work safely;
  - Defining, establishing, and maintaining, as assigned, a hazard-control system that effectively mitigates the hazards associated with the work and meets institutional and facility requirements;
  - Determining that the work has been authorized before proceeding with it;
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## 5.0 RESPONSIBILITIES (cont.)

- 5.2 Workers (cont.)**      Workers, with assistance as needed, are responsible for (cont.)
- Acquiring the knowledge and skills needed to perform the work;
  - Obtaining and maintaining authorization to perform the work;
  - Understanding and following all operational requirements and restrictions related to the work;
  - Performing the work safely;
  - Improving the safety of the work by reviewing the work, commensurate with the level of risk, and incorporating lessons learned;
  - Using an appropriate change-control process to document and communicate changes made in the hazard control system; and
  - Stopping the work if it seems to be unsafe.
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- 5.3 Line Managers/ Supervisors**      Line managers/supervisors are responsible for
- Defining the scope of work;
  - Ensuring that an effective hazard-control system is established to reduce the risk posed by the work to an acceptable level;
  - A periodic review of the process used to assign and mitigate initial risk;
  - Ensuring that institutional and facility requirements and restrictions on the work are followed;
  - Authorizing the defined work, when the risk has been controlled to an acceptable level;
  - Authorizing workers to perform the work, after they have documented adequate knowledge, skills, and abilities;
  - Ensuring that workers perform the work safely;
  - Improving the safety of the work by reviewing the work, commensurate with the level of risk, and ensuring the incorporation of lessons learned; and
  - Ensuring that an appropriate change-control process is used to document and communicate changes made in the hazard-control system.
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- 5.4 Subject Matter Experts**      Not applicable to the procedures described in this document.
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## 6.0 PRECAUTIONS AND LIMITATIONS

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This document establishes the basic requirements for collecting water and fish samples from a boat/raft for the Environmental Monitoring Program. This procedure applies to all personnel performing field procedures described in this document. Work performed under this procedure by LANL personnel will occur only after all other applicable procedures have been reviewed and signed as listed under Section 7.0 of this document.

Before any work is to begin, a Permit for Scientific Collection must be obtained from the New Mexico Department of Game and Fish.

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### 7.0 SAFE WORK PRACTICE REQUIREMENTS

#### 7.1 Define the Work

Project Personnel - In accordance with the procedure for field work, a minimum of two people is required to go out in the field. At least two members of the boat or raft crew must receive the following training before going on a boat trip:

- First Aid
  - Cardiopulmonary Resuscitation (CPR)
  - Field Survival, when this training is available
- 

Cautions - Primary health and safety concerns are weather and boat operation. High winds and high waves could cause the boat or raft to be swamped or to capsize. Lightning is an extreme threat to personnel on or in the water.

Some hazards related to boat operation include collisions, running aground, falling overboard, capsizing, flammable gasoline, propeller blades, and electrical shock from the battery.

Electrofishing is an inherently hazardous activity in which safety is the primary concern. The electrical energy used in electrofishing is sufficient to cause death by electrocution. Catfish are sometimes the desired species of interest and, since they are night feeders, it may only be possible to capture sufficient numbers of catfish during nighttime hours. While darkness is not, in and of itself, a hazard, it might intensify or make more likely the hazards associated with this activity. The main controls used to minimize the effects of darkness are extra awareness and lighting. The SR-17 Catacraft is fitted with 12-V AC work lights in the fish capture area around the boat, bright halogen lights on the work deck, Coast Guard-approved navigation lights, inside deck lights, and bright floodlights on the stern.

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Boat Description - The group currently uses an 18.5-ft pontoon boat with a 75-hp Mercury Marina motor for fish sampling. The boat has a 7-passenger/990-pound capacity. The boat is transported on a single-axle trailer equipped with running lights and requires a 2 5/16-in. ball for towing.

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Raft Description - The group uses a SR-17 Catacraft Electrofishing craft that has a 1600-pound capacity/930-pound payload. This boat is rated and certified by the Boating Industry Association. The raft is equipped with 3-chamber Dupont Hypalon pontoons. The raft has a four-person capacity, and is steered with two blade paddles or a 35-hp outboard motor.

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Equipment Needed for Using the Boat - For the boat, the following equipment is required:

- first aid kit;
- radio, cellular phone, or other radio/telephone;
- Coast Guard approved life jackets for everyone on board;
- life ring with 30 ft of rope;
- oars;
- distress whistle;
- adequate fuel; and
- fire extinguisher.

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### 7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

#### 7.1 Define the Work (cont.)

Equipment Needed for Using the Raft – For the raft, the following equipment is required:

- paddles;
  - Coast Guard-approved life jackets for everyone on board;
  - repair equipment for raft;
  - cooler with ice;
  - sampling gear, bottles, and plastic bags;
  - food, water, and cooking gear;
  - radio, cellular phone, or other radiotelephone; Handy Talky;
  - first aid and snake bite kit;
  - personal gear (sleeping bag, extra clothing, etc.);
  - appropriate cold weather clothing, such as polypropylene or even neoprene wetsuits.
- 

Preparing for a Trip – At least two trained or experienced people are required for either the boat or raft. At least one person must be experienced in towing and backing trailers and in loading and unloading the boat at the water. All participants must know how to swim and must wear life jackets at all times while on board the boat/raft.

Personnel should be familiar with all applicable New Mexico boating regulations. Current copies of federal and state regulations are kept in boat portfolio and the group office.

Ensure that the boat is in good running condition and has been inspected by the group vehicle coordinator during the current calendar year. Ensure that the hitch safety chains are in good condition and that the running lights work.

Collect the equipment listed above, for either the boat or raft, and other equipment needed for the sampling to be performed.

Ensure that the weight of the personnel and equipment does not exceed the boat or raft capacity (990 lbs for the boat or 1600 lbs for the raft).

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Check the Weather - Check the weather forecast the morning of the sampling trip. If high winds (>20 mph), rain, and/or thunderstorms are predicted, STAY OUT OF THE WATER.

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Check the Boat Equipment - For the boat, check the following items:

- Ensure that the boat has new gas (eliminates engine problems).
  - Check oil injector level.
  - Ensure that the battery is charged.
  - Ensure that drain plug is in boat.
  - Check pontoon for any major damage (i.e., holes or big dents).
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Departure and Itinerary - Before departure, inform the group office of your destination and estimated time of return. For multi-day trips, leave a detailed itinerary and the plans for checking in periodically. When leaving Los Alamos County you must be placed on official Laboratory travel status. If your time of return will be after 4:30 p.m., make arrangements to check in with your supervisor when you return.

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### 7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

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While at the Lake or River - Notify reservoir officials of your arrival and departure.

Stay seated while boat/rafts are in motion.

Wear life jackets at all times when in the boat or raft.

#### In Case of Emergency

Injury - Administer appropriate first aid and provide appropriate transportation of injured person to Occupational Medicine Group medical station or hospital. Medical examination of Laboratory employees by the Occupational Medicine Group is mandatory for work-related injuries. Contractor employees must go to the nearest private hospital.

Notify the reservoir authorities and the group office in a timely fashion. The **group leader** will notify the Safety & Risk Assessment Group and the health and safety division office or the Emergency Management Office (EMO) at 667-6211. If the injury occurred in a vehicle accident, the group office also notifies the local police department.

Boating Accident - Notify the reservoir authorities and the group office in a timely fashion. The group leader will notify appropriate Laboratory organizations such as the Safety Group, division office, or the Laboratory Emergency Response Coordinator.

Overdue Personnel - If an employee is overdue during working hours, the employee's supervisor will notify the group office.

During or after working hours, the supervisor will notify the group leader or designee if the employee is missing.

The group leader or designee will verify, insofar as possible, the known circumstances and conditions of the employee's absence. The group leader will notify the division office and make a recommendation for action to be taken, including contacting the New Mexico State Police (which coordinates search and rescue).

#### 7.2 Identify and Evaluate Hazards

##### Hazard

##### Initial Risk Level based on Severity and Likelihood

A) Off-road automobile accidents and towing a trailer	LOW
B) Wildlife encounters (plague, hantavirus, ticks, etc.)	LOW
C) Environmental hazards (high winds or waves)	LOW
D) Boat/raft accidents	LOW
E) Drowning	LOW
F) Electrocution	MEDIUM
G) Lifting and moving heavy items	LOW
H) Repetitive motion and other ergonomic hazards	LOW

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### 7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

#### 7.3 Develop and Implement Controls

##### 7.3.1 Development

<u>Hazard</u>	<u>Hazard Control</u>	<u>Residual Risk Level</u>
A Off-road automobile accidents and towing a trailer	LANL personnel will follow operating procedures discussing off-road vehicle use and towing.	MINIMAL
B Wildlife encounters (plague, hantavirus, ticks, etc.)	In accordance with recommendations set by the State of New Mexico Environmental Department, all personnel should wear long pants, long-sleeved shirts, and insect repellent. Do not handle dead or sick rodents. When you have returned from the field, perform a self-check for the presence of ticks.	MINIMAL
C Environmental hazards (high winds or waves)	LANL personnel will cease operations during inclement weather as described in RRES-ECO operating procedures for conducting general fieldwork. All work will be performed within a safe distance to vehicles. The distance will be based on current field conditions and terrain with respect to current and expected weather conditions.	MINIMAL
D Boat/raft accidents	Review a copy of the "New Mexico Better Boating and Regulations" (published by the New Mexico Parks and Recreation Bureau of Boating Safety), which is available for review in the group library. Before the activity begins, hold a brief safety meeting.	MINIMAL
E Drowning	All participants must know how to swim and must wear life jackets at all times while on board the boat/raft.	MINIMAL
F Electrocution	Avoid contact with electrodes and water during operation. Ensure that your skin and clothing are dry. Always operate under the 'buddy system' with effective means of communication. Read and understand 'Electrofishing Orientation' (Attachment 1).	LOW
G Lifting and moving heavy items	Use carts or dollies. Use a helper.	MINIMAL

### 7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

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<b>7.3.1 Development (cont.)</b>	<b><u>Hazard</u></b>	<b><u>Hazard Control</u></b>	<b><u>Residual Risk Level</u></b>
	H Repetitive motion and other ergonomic hazards	Take a short break every hour.	MINIMAL
<b>7.3.2 Documentation</b>	<p>All personnel assigned to participate in sampling from electrofishing craft will have read this hazard control plan/operating procedure and 'Electrofishing Orientation' (Attachment 1) and will have signed the Training Documentation Sheet (Attachment 2).</p> <p>Any future changes to this operating procedure will be properly documented and will be reflected by the revision number that is included with the document identification number.</p>		
<b>7.3.3 Authorization of Work</b>	<p>All LANL workers involved with this activity will obtain authorization from their direct supervisor, group leader, or deputy group leader. No work will be performed until this authorization has been granted. The residual risk levels for performing activities related to this activity have been determined based on consultation with subject matter experts including contractor personnel and LANL personnel experienced in this type of procedure.</p> <p>All work related to this activity will be reviewed, at a minimum, on an annual basis, and this document updated to reflect changes as deemed necessary.</p>		
<b>7.3.4 Authorization of Workers</b>	<p>LANL workers will be granted authorization to perform this work only after they have reviewed all appropriate required documentation and training that applies to LANL personnel. All contractor personnel will perform this work only after they have provided proof of appropriate documentation that applies to contractor responsibilities.</p>		
<b>7.4 Perform Work Safely</b>	<p>All personnel involved with this activity will adhere to all safety guidelines and procedures as described in the appropriate documents, including this document. Contractor personnel will be responsible for ensuring self-readiness checks before performing the work. LANL personnel will perform self-readiness checks before performing fieldwork. Field conditions, including weather conditions, will be evaluated as to the effect they will have on performing field activities safely. If activities can not be performed safely, all activities will cease until such time the LANL project leader authorizes work to resume.</p>		
<b>7.5 Provide Feedback and Continuous Improvement</b>	<p>At a minimum, the activity described in this document will be evaluated annually. If any changes are made to the procedure, those changes will be evaluated as to whether or not they may introduce new hazards. Any new hazards will be evaluated and appropriate controls implemented to reduce their risk to an acceptable level. A periodic review with project personnel will be made to evaluate the accuracy of this document with respect to field operations.</p>		

## 8.0 RISK DETERMINATION

The determination of risk for each activity described in this document was based on the Risk Determination matrix given in LIR300-00-01, Safe Work Practices.

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### 9.0 TRAINING

The following training must be completed and confirmed by the PI of the project before work can begin:

For each worker:

- General Field Work HCP/OP (LANL-RRES-ECO-HCP/OP-001) must be read and documented.
- Thermal Stress Awareness Training must be taken when it becomes available
- Acknowledgment must be given about ability to swim.

For each field crew:

- At least two people must have current First Aid Training.
  - At least two people must have current CPR Training.
  - At least one person must have completed principles and techniques of electrofishing training or equivalent.
  - At least one person must be trained in the New Mexico Boating Safety Class, provided by the New Mexico Parks and Recreation Bureau of Boating Safety.
  - Members must have site-specific training as required by the location where work is occurring.
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### 10.0 REFERENCES

**10.1 Source Documents** The following documents, which can be found in the Team Leaders (Phil Fresquez) Office located at TA-21, Building 210, Room 222, are referenced in this procedure:

- LANL-RRES-ECO-HCP/OP-001, "General Field Work"
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**10.2 Document Coordination** RRES-ECO (Ecology Group) of the Risk Reduction and Environmental Stewardship Division is the group of institutional coordination responsible for developing, revising, and maintaining the contents of this document.

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### **Attachment 1**

#### **Electrofishing Orientation**

1. Electrofishing is an inherently hazardous activity in which safety is the primary concern. The electrical energy used in electrofishing is sufficient to cause death by electrocution.
2. During operations, it is critical to avoid contact with electrodes and surrounding water. The electric field is most intense near the electrodes and can extend 5 to 10 meters outward.
3. The electrodes are energized by the power source, a generator or battery, and controlled by safety switches; these switches must remain off until the signal is given to begin electrofishing.
4. The power source has a main switch that must be turned off immediately if an emergency occurs.
5. The electrodes are usually metal probes suspended in the water. If direct current is used from the boat, the anodes (+) are in the front of the boat to catch fish and the cathodes (–) may be suspended from the sides; both can produce electroshock. When a metal boat is the cathode, the boat is safe as long as all the metal surfaces inside it are connected to the hull.
6. Movable anodes on a boat are dangerous, especially on metal boats. All electrodes on a conventional electrofishing boat should be in a fixed position during operation.
7. Dry skin and clothing are good protection against electroshock. The body should be fully clothed during electrofishing. Rubber knee boots are minimal protection, as are rubber gloves. A personal flotation device must be worn at all times while onboard the craft. Ear protection is necessary for those working near the generator.
8. At least two members of the crew must have knowledge of CPR and first aid. A first aid kit and a fire extinguisher must be within immediate reach during an operation. Electroshock can cause heart fibrillation or respiratory arrest; CPR can cure only the latter. The crew must know the location of the nearest defibrillation unit.
9. A communication system, particularly hand signals, must be available to all crew members. When multiple anodes are used in an operation, the buddy system must be used. Above all, NEVER OPERATE ALONE.
10. Stunned fish should be removed from the electric field as soon as possible and not subjected to continuous electroshock by being held in the dip net. Using the anode as a dip net is unhealthy for the fish and people and should be avoided.
11. An electrofishing operation should proceed slowly and carefully; avoid chasing fish and other sudden maneuvers. Night activities require bright, bow-mounted headlights. Operations should cease during lightning and thunderstorms; use discretion during rain. Avoid electrofishing too close to bystanders, pets, or livestock.
12. All crew members should know who their leader is and recognize his or her authority as final in operational decisions. However, every crew member has the right to ask questions or express concern about any safety aspect of operations. A crew member has the right to decline participation in an electrofishing operation, without fear of employer recrimination, if he or she feels unsafe in participation.

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### **Attachment 2**

#### **Training Documentation Sheet**

#### **Hazard Control Plan/Operating Procedure for Boat/Raft and Water Safety**

I, the undersigned, have read and fully understand the Hazard Control Plan/Operating Procedure for  
Boat/Raft and Water Safety.

Signed \_\_\_\_\_ Date \_\_\_\_\_

Print Name \_\_\_\_\_

Self-Study Training \_\_\_\_\_ Date \_\_\_\_\_  
(Supervisor's signature)

On-the-Job Training \_\_\_\_\_ Date \_\_\_\_\_  
(as required) (Supervisor's signature)